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UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office

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Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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08/896,514 06/23/97 GARDNER

C 95-004M

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PM82/0813

EXAMINER

MAR, M

ART UNIT	PAPER NUMBER
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3611

DATE MAILED: 08/13/99

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action SummaryApplication No.
08/896,514

Applicant(s)

Conrad O. Gardner

Examiner

Michael Mar

Group Art Unit

3611

☐ Responsive to communication(s) filed on _____☐ This action is **FINAL**.☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire Three month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims☒ Claim(s) 30-41 and 46-54 is/are pending in the application.Of the above, claim(s) 30-33 is/are withdrawn from consideration.☐ Claim(s) _____ is/are allowed.☒ Claim(s) 34-41 and 46-54 is/are rejected.☐ Claim(s) _____ is/are objected to.☐ Claims _____ are subject to restriction or election requirement.**Application Papers**☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.☐ The drawing(s) filed on _____ is/are objected to by the Examiner.☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.☐ The specification is objected to by the Examiner.☐ The oath or declaration is objected to by the Examiner.**Priority under 35 U.S.C. § 119**☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been☐ received.☐ received in Application No. (Series Code/Serial Number) _____☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).**Attachment(s)**☐ Notice of References Cited, PTO-892☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____☐ Interview Summary, PTO-413☐ Notice of Draftsperson's Patent Drawing Review, PTO-948☐ Notice of Informal Patent Application, PTO-152

— SEE OFFICE ACTION ON THE FOLLOWING PAGES —

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DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 34, 35, 37, 40 & 50-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ellers(of record).

Ellers discloses a pre-programmed control 25 which activates the internal combustion engine 21 and the electric torque converter 35 for coupling the engine to the second pair of wheels 15 & 17 when the vehicle approaches a pre-selected desirable speed of 55 mph. Since Ellers describes the preselected desirable speed at which the engine is activated as a cruising speed(col. 1, lines 55-58), after this speed has been reached, the vehicle is in a condition which constitutes a "cruise mode on condition". When the speed drops below 55 mph, the control decouples the engine from the second pair of wheels. This condition constitutes a "cruise mode off condition". The control could also activate a second coupling 65 for connecting the engine to an electric generator 63 for charging a battery 5 during the "cruise mode off condition". The internal combustion engine 21, being a small engine with no throttle control, would operate at a constant speed for maximum

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efficiency and minimum pollution. With respect to claims 42-44, note the control system for using only the electric motor at speeds below the pre-selected desirable speed of 55 mph. As the vehicle approaches the pre-selected desirable speed, the control system activates the internal combustion engine and disconnects electric power to the electric motor. Since the electric motor is always operating below the pre-selected desirable speed, the speedometer 67 would function as a display device for indicating when the electric motor is powering the hybrid vehicle at the lower speeds. With respect to claims 37 & 40, the engine drives the wheels when the vehicle is above the pre-selected desirable speed. When the battery charge is low, the control switches to a second mode in which power from the engine is transferred to the generator.

It would have been obvious to program the control circuit of Ellers to always connect the engine to the generator during the cruise mode off condition in order to maintain a fully charged battery. With respect to claim 50, since the cruise mode is set only when the vehicle has reached a predetermined speed, it would have been obvious to activate the cruise mode only after a predetermined period of time in which rapidly shifting power and speed demands have not occurred in order to provide a consistent speed for the cruise mode. With respect to claim 51, since Ellers teaches using the engine to drive the generator whenever the charged state of the battery is too low, it would have been obvious to activate the engine for charging the battery, even during periods of low speed when the electric motor is used to power the vehicle.

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3. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ellers in view of Fields et al (of record).

Fields et al discloses a hybrid vehicle having an electric motor for driving a pair of rear wheels and an internal combustion engine for driving a pair of front wheels and teaches using only the engine for propelling the vehicle in the event the batteries are run down.

It would have been obvious to provide the vehicle of Ellers with the capability of using only the internal combustion engine for propelling the vehicle as taught by Fields et al in order to permit the vehicle to operate in the event the electric motor becomes damaged.

4. Claims 38, 39 & 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ellers in view of Miyake et al.

Miyake et al teaches the old and well known use of timing circuits for determining the actuation of a transmission thereby preventing "hunting" or rapid shifting of the transmission shift when the vehicle is operating within the criteria for shifting of the transmission.

It would have been obvious to provide the control means of Ellers with a timing circuit for delaying the transfer of driving forces from the engine to the wheels after the predetermined running state value has been sensed as taught by Miyake et al, in order to produce a smoother vehicle operation by reducing the amount of on/off cycling required by the engine. With respect to claims 41 & 45, it would have been further obvious to set the speed at which the internal

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combustion engine is activated to that of 40 mph in order to maintain a higher battery charge, thereby permitting extended use of the electric motor at the lower speeds.

5. Claims 46-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kenyon in view of Lynch et al(both of record).

Kenyon discloses a four-wheel driven hybrid vehicle comprising an internal combustion engine 10 connected to a first pair of wheels through a clutch 12, an electric motor 54 connected to a second pair of wheels, and a control system for interrupting the operation of the internal combustion engine and activating the electric motor when the vehicle speed has dropped below a predetermined speed, and for interrupting the operation of the electric motor and activating the internal combustion engine when the vehicle is driven above a predetermined speed. In the event the electric motor becomes inoperable, the internal combustion engine could be used to power the vehicle. Lynch et al discloses a hybrid vehicle having a clutch and a transmission interposed between an internal combustion engine and driven wheels of the vehicle.

It would have been obvious to provide the hybrid vehicle of Kenyon with a transmission between the clutch and the driven wheels as taught by Lynch et al in order to provide a more efficient use of the engine power.

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REMARKS

6. Since Ellers teaches recharging the battery whenever the battery is low, it would have been obvious to activate the engine to recharge the battery at all operating speeds of the vehicle as explained above. This would even apply to conditions of low speed when only the electric motor is normally operated. Specific numeric values such as the speed at which the vehicle is in the cruise mode and the specific time before actuation are considered obvious variables which would depend upon the desired mode of operation by the user.

7. Any response to this action should be mailed to:

Assistant Commissioner for Patents

Washington, D.C. 20231

or faxed to:

(703) 308-2571

(for formal communications intended be entered)

(all informal communications should be labeled "PROPOSED" OR "DRAFT")

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or hand delivered to:

Crystal Park 5, 2541 Crystal Drive, Arlington, Virginia 22202

Seventh Floor(receptionist)

8. Any inquiry concerning this communication should be directed to Michael Mar at telephone number (703) 308-2087.

Michael Mar

MICHAEL MAR 8-12-99

M.Mar

8-12-99